



Innovation Award

Lieutenant Colonel Kara M. Cave

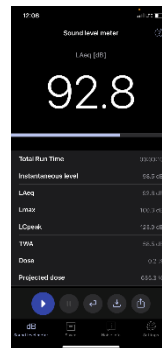
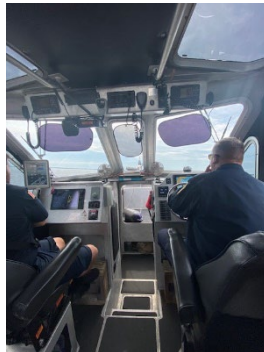
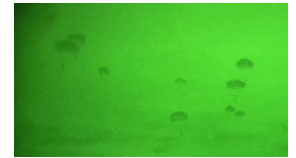
U.S. Army, Fort Liberty Hearing Program
Army Office of the Surgeon General

February 9, 2024



Fort Liberty, North Carolina

- Over 45,000 Soldiers enrolled in the Hearing Conservation Program
 - 17,000 Paratroopers in the 82nd Airborne Division
 - Elements of US Army Special Operations Command
- Noise-exposed civilian employees at Ft Liberty and Military Ocean Terminal Sunny Point



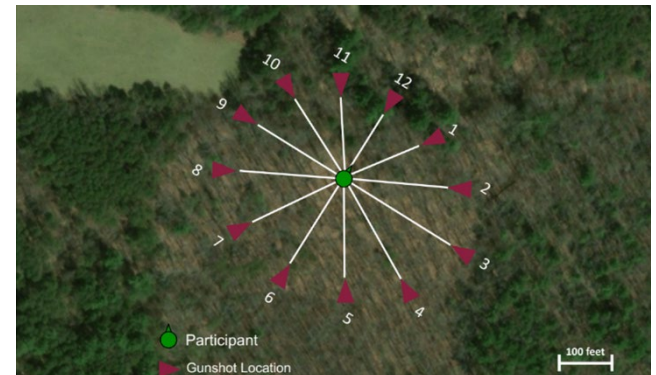
Fort Liberty Hearing Conservationists

- Team of four providers and eight technicians
- New tablet-based health education delivery
- In-person training (thank you, COL Curry-Mathis!)
- Increased testing capacity by 50% due to equipment realignment and changing hours
- Boothless audiometry + fit-testing



Systems Approaches to Army Challenges

- **Detection, Recognition, Intelligibility, Localization, and Communication** (Lee & Casali 2017)
- Evaluate situational awareness in a systematic manner (Thompson et al., 2023)
- Rapid assessment of listening tasks with hearing protectors
- Produced system to evaluate localization



Aviation and Fitness-for-Duty

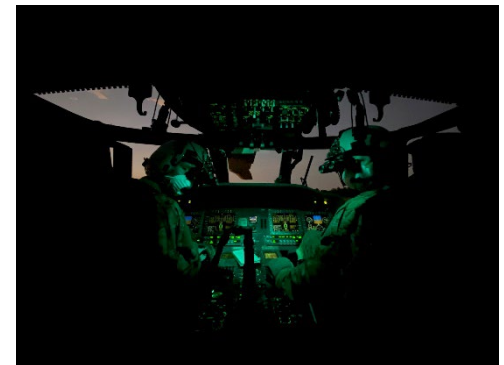
Acceptable audiometric hearing levels for Army aircrew members and ATC

Class	500 Hz	1000 Hz	2000 Hz	3000 Hz	4000 Hz	6000 Hz *
1/1A	25	25	25	35	45	45
2/3/4	25	25	25	35	55	65

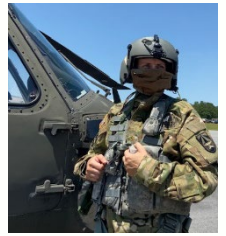
WAIVERS: Unrestricted waiver can be considered depending on amount of hearing loss and functional capability, provided a complete Audiological evaluation indicates ~~no underlying pathology, and binaural speech recognition score is 84% or higher.~~ Aircrew members with a recognition score of less than 84% may receive a waiver, but are generally handled on a case-by-case basis. Patients who are H4 profile will inevitably be disqualified.

Aviation Fitness-for-Duty Standards

- Standards not validated against flight tasks
- Effects of cognitive workload and hearing loss on performance
- Real-time hearing loss simulator (Sheffield et al., 2017)
- Current standards not predictive of performance, MRT_{80} more predictive
- High workload + hearing loss, performance degraded significantly



System Evaluations



- \$25M Congressional add for electronic hearing protector
 - DRILCOM as a foundation to assess auditory situational awareness
 - Assess product according to military standard, ANSI standards
- Aviation aircrew helmet design- pass-through microphones

CAUTION:
Permanent hearing damage could occur if CEPS power switch is turned "on" in a high decibel environment.

CAUTION:
Performance of CEPS in close proximity to the aircraft with rotors turning is not known. Crewmembers should anticipate turning the CEPS power switch to the "off" position when approaching an aircraft on the ground with rotors turning.

- Design medical alarm display in medical evac platforms (Kroening et al., 2023)
- Assist in design for audibility and spatial array

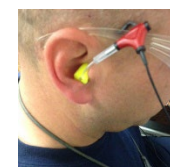


Anniston Army Depot

- 2014, 34% STS rate, 4% OSHA reportable
- 2015 MeadWestvaco Corporation Safe in Sound presentation
 - Fit-testing, many systems
 - Small group and individual education (Hearing Program Officer Training for all employees)
- 2016, STS rate dropped by 10% from previous year
- <2% OSHA reportable rate

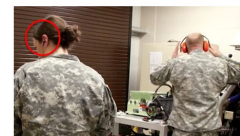


<https://www.safeinsound.us/archive.html#mead>

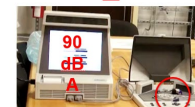


105 dBA running if "open"
Double Protection Required
94 dBA running at idle

+



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Definitely not hearing protection!!!!



Advent of Army Hearing Readiness

- 2006, Global War on Terror (GWOT) presented considerable challenges with spike in training and blast-related injuries
- Resources re-aligned to support GWOT
- Drastic cuts to Army Audiology
- Fitness-for-duty challenges with increased activations of US Army Reserves and National Guard

Following their Lead

- COL Kathy Gates assigned to Army Office of the Surgeon General
 - Generated hearing readiness requirements
 - Annual testing, earplug fitting, and fitness-for-duty requirements
- CPT Curry-Mathis served as Hearing Program Manager for deploying mechanized (tanks) infantry division (>15,000 Soldiers)

The screenshot displays the MEDPROS web application interface. At the top, the logo reads "MEDPROS FORCE HEALTH PROTECTION". The navigation bar includes links for Home, SRP Processing, Immunizations, Medical Readiness, and MMDE Reports. Below the navigation bar, a search bar contains the text "Type SSN / EDIPN or Scan ID Card". To the right of the search bar, the user's name "Name: CAFE KARRA H", rank "Rank: LTC", and other identifiers "DOB:", "IBC: W216TD", and "Gender: F" are visible. The main content area is titled "Medical Readiness" and "HEARING". It contains a "Hearing Readiness Classification" section with a note: "The Hearing Readiness Classification (HRC) is displayed in the SRP Checklist". Below this, there are several form fields and dropdown menus: "Hearing Readiness Status" with radio buttons for "002215" and "002216"; "Hearing Profile" with a dropdown menu set to "H2"; "DA Form 3349 Complete" with a dropdown menu set to "Y"; "Hearing Medical Non Deployable Profile" with a dropdown menu set to "Other"; "Hearing Protection Type" with a dropdown menu set to "Other"; "Hearing Aid w/3 month supply of batteries" with a dropdown menu set to "NA"; "STS" with a dropdown menu set to "N"; "Date" with a date picker set to "2023/07/20"; "Complete Audiological Evaluation" with a dropdown menu set to "Y"; "HAR2 Complete" with a dropdown menu set to "NA"; and "Issue and fit combat arms, triple-flange, or quad-flange earplug with carrying case" with a dropdown menu set to "Y". At the bottom right of the form, there are "Save" and "Cancel" buttons.

Outcome Measures

- Then CPT Curry-Mathis (now COL) furnished:
 - Health education briefing in terminal for Freedom Flights
 - Non-linear earplug fitting
 - Pre- and post-deployment surveillance testing
- Despite year-long deployment, STS remained half of Army rate
- Temporary assignment afforded data analysis
- Funded non-linear hearing protection for deploying Soldiers
- Funded Medical Protection System (MEDPROS)
- No Army Audiology positions eliminated



LESSONS LEARNED

- Immerse yourself in your patient needs
- The most innovative products result from collaboration
- Do not be afraid to fail, it will only assist in converging on solutions

SIGNIFICANCE OF THE AWARD

- Surgeon General's Consultant:
Communicate the innovation of the profession
- Every new advancement presents an opportunity for research
- Encourage those at their installations to serve as data collection sites

This Safe in Sound Award represents the aggregation of efforts of talented researchers, clinicians, practitioners and Army Officers for the benefit of our Service Members. Thank you to all for the honor of protecting them!

CONTACT INFORMATION

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